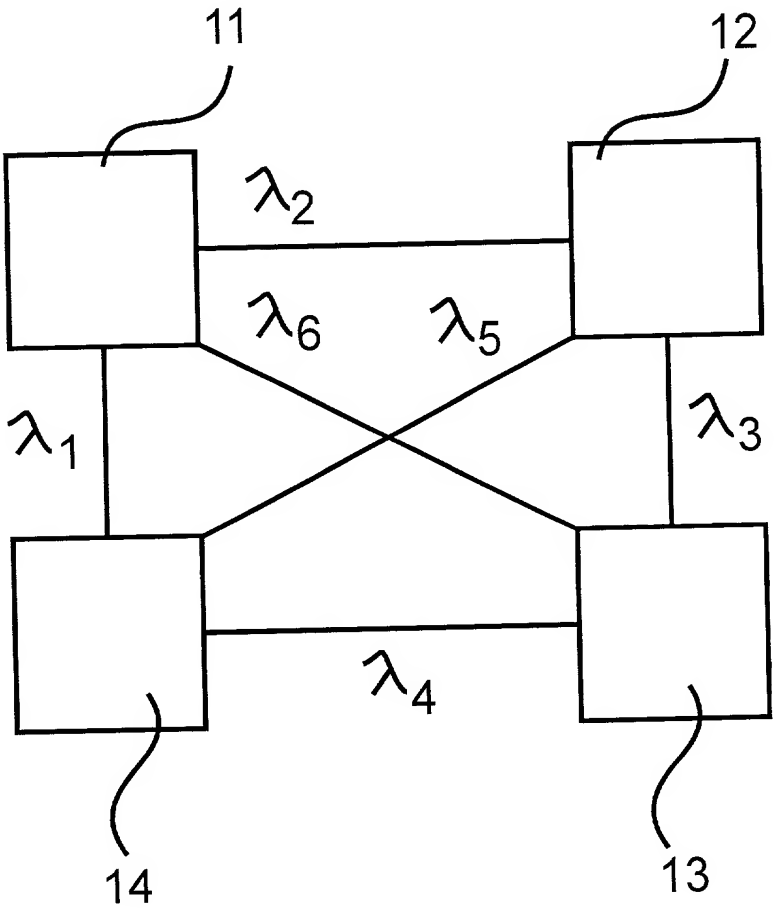

Fig. 1

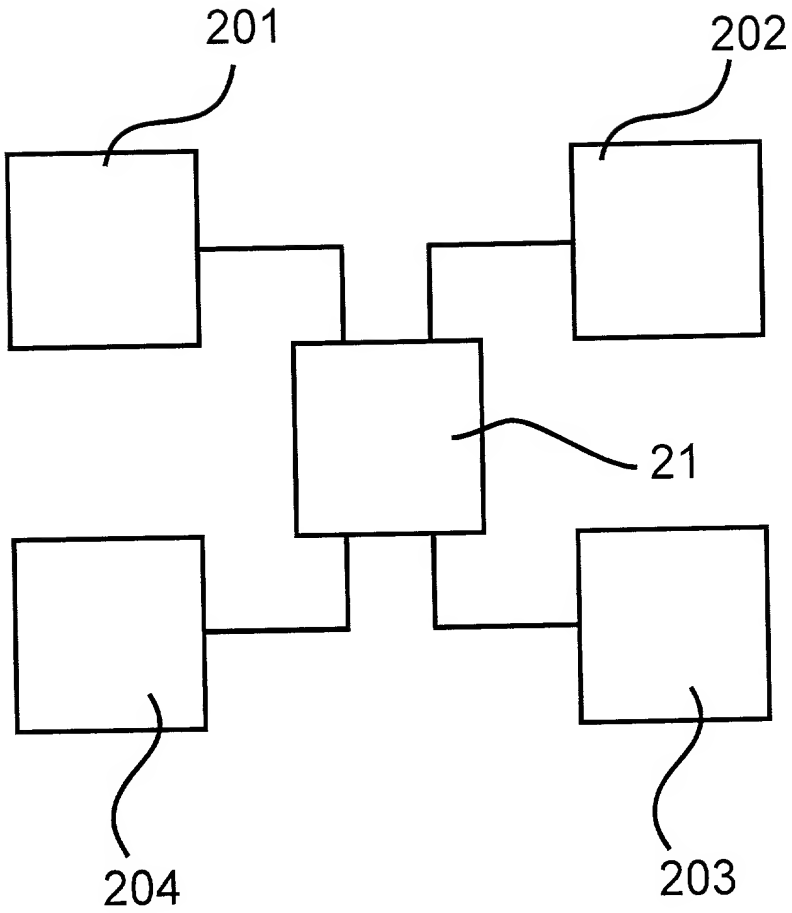

Fig. 2

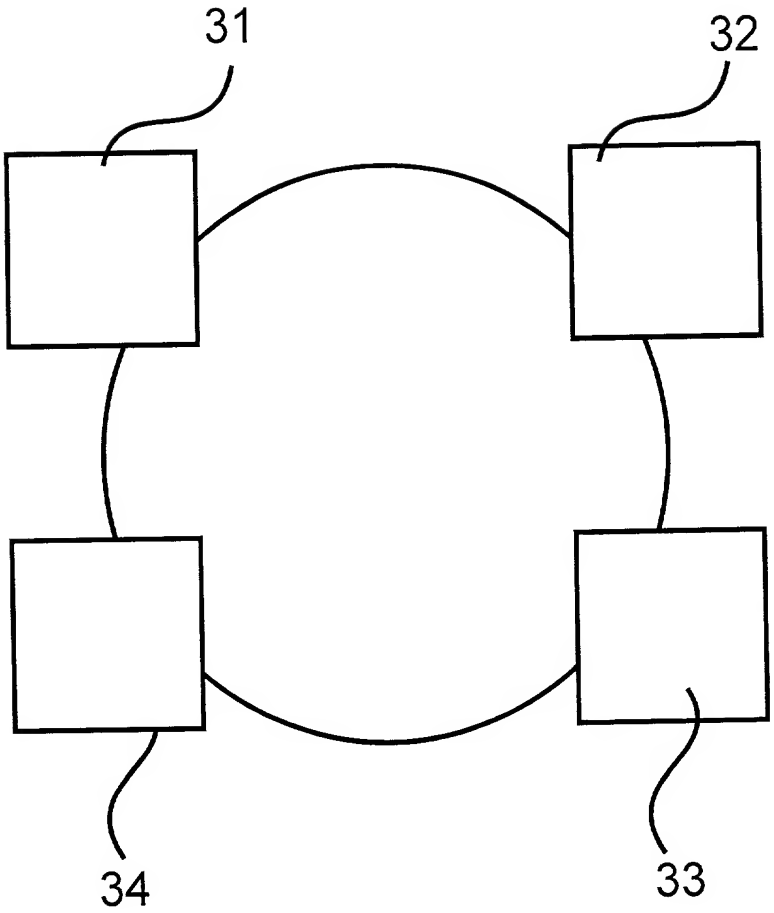

Fig. 3

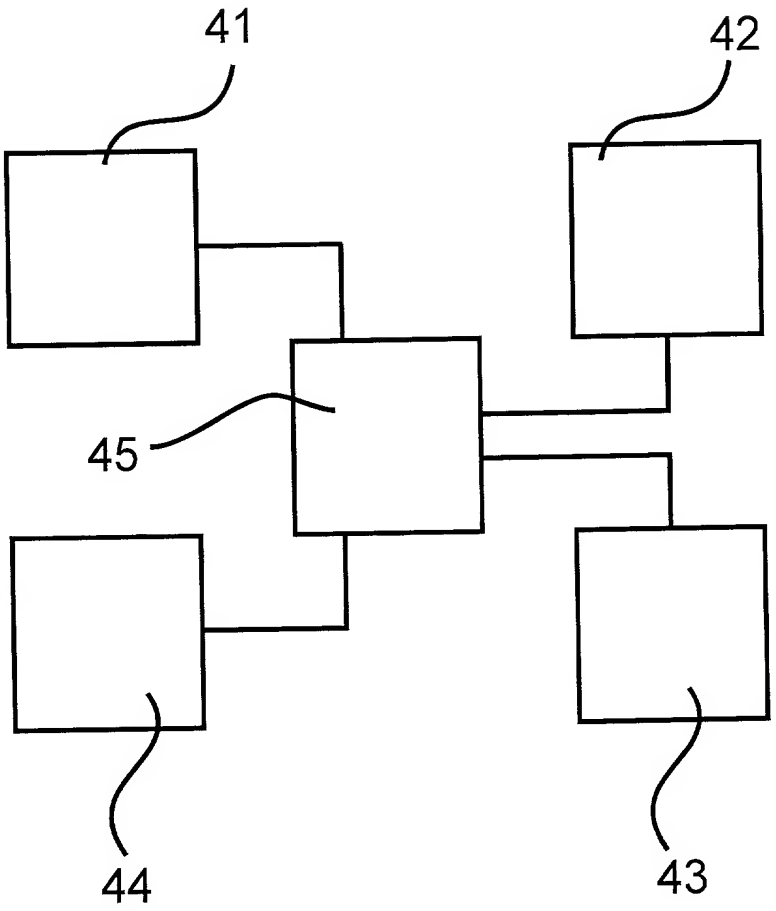

Fig. 4

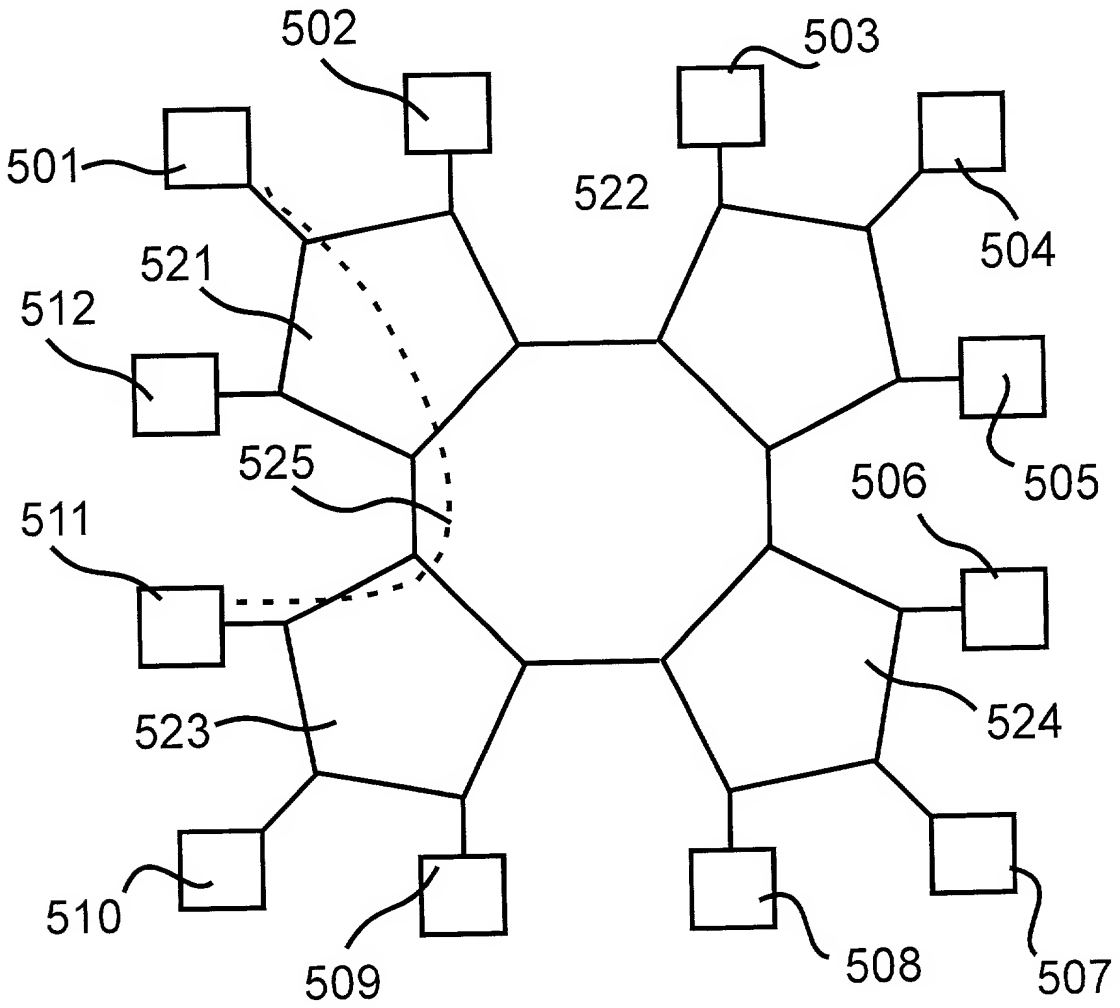
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Fig. 5

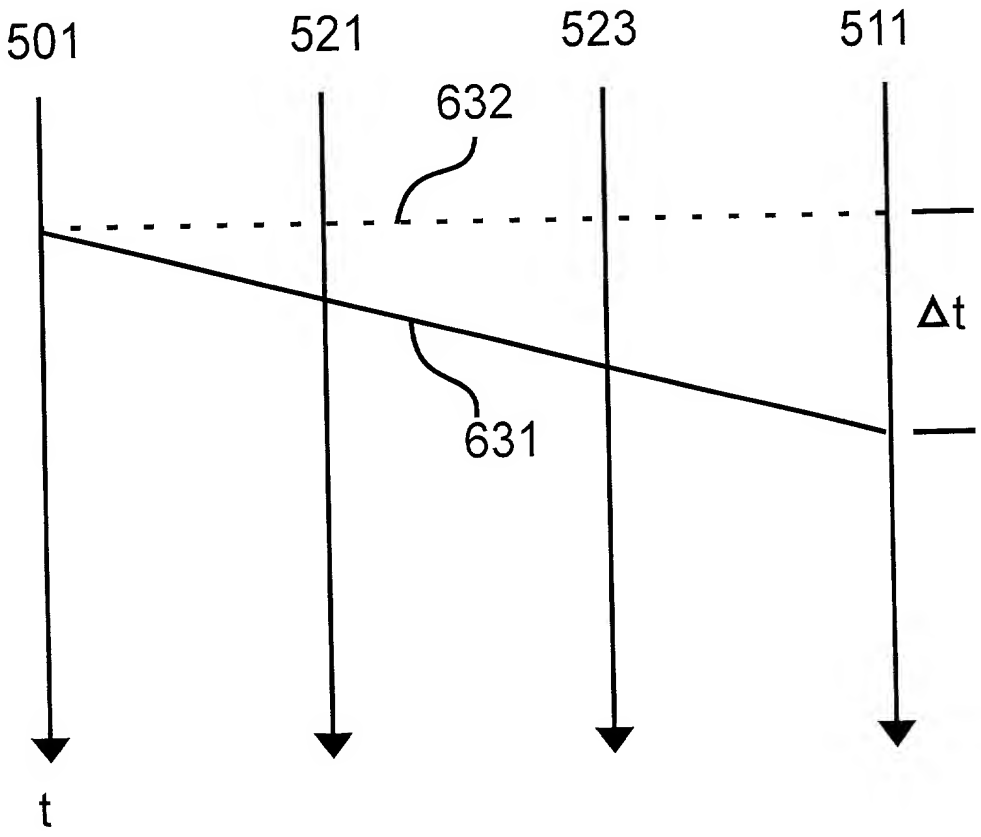

Fig. 6

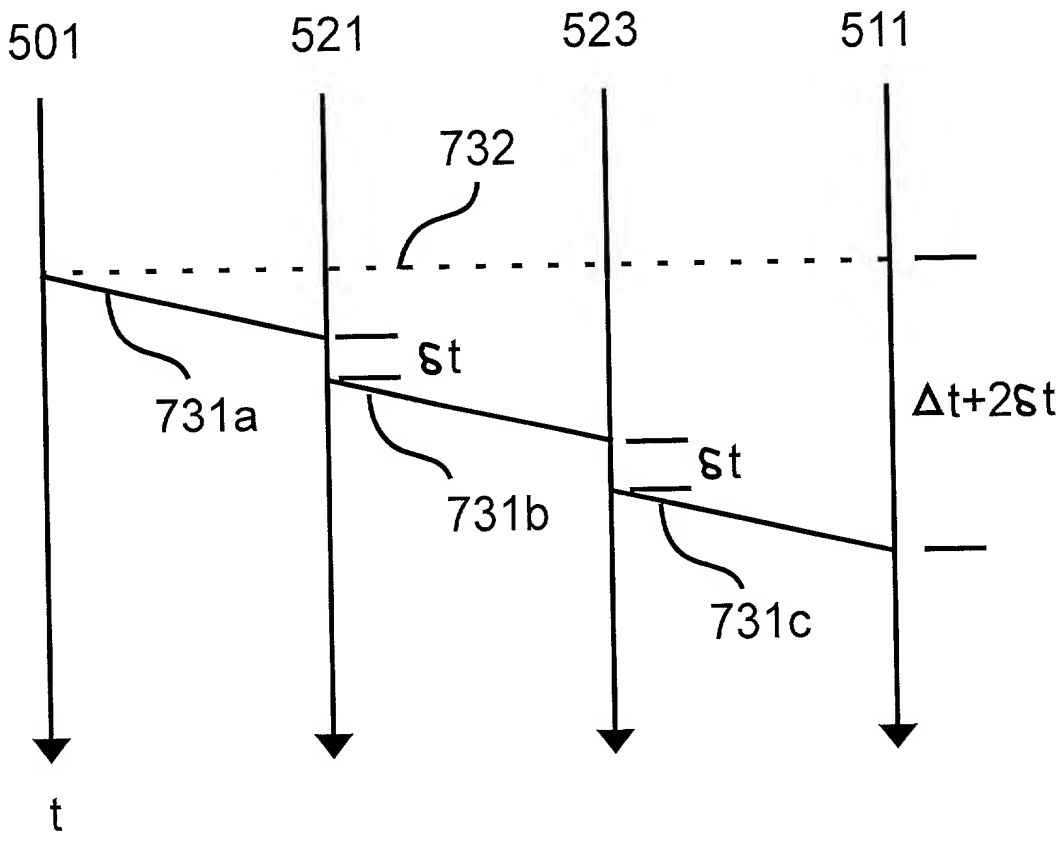

Fig. 7

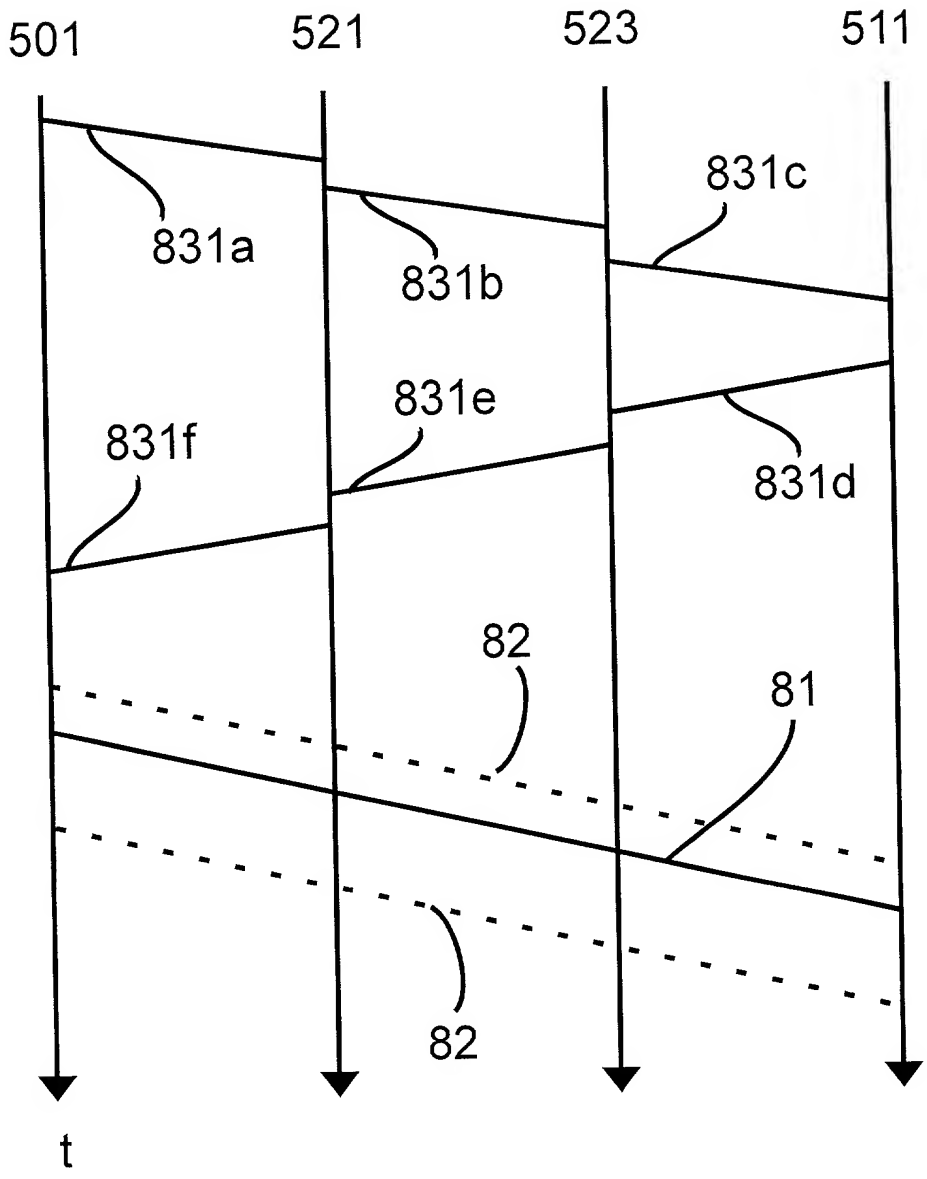

Fig.8

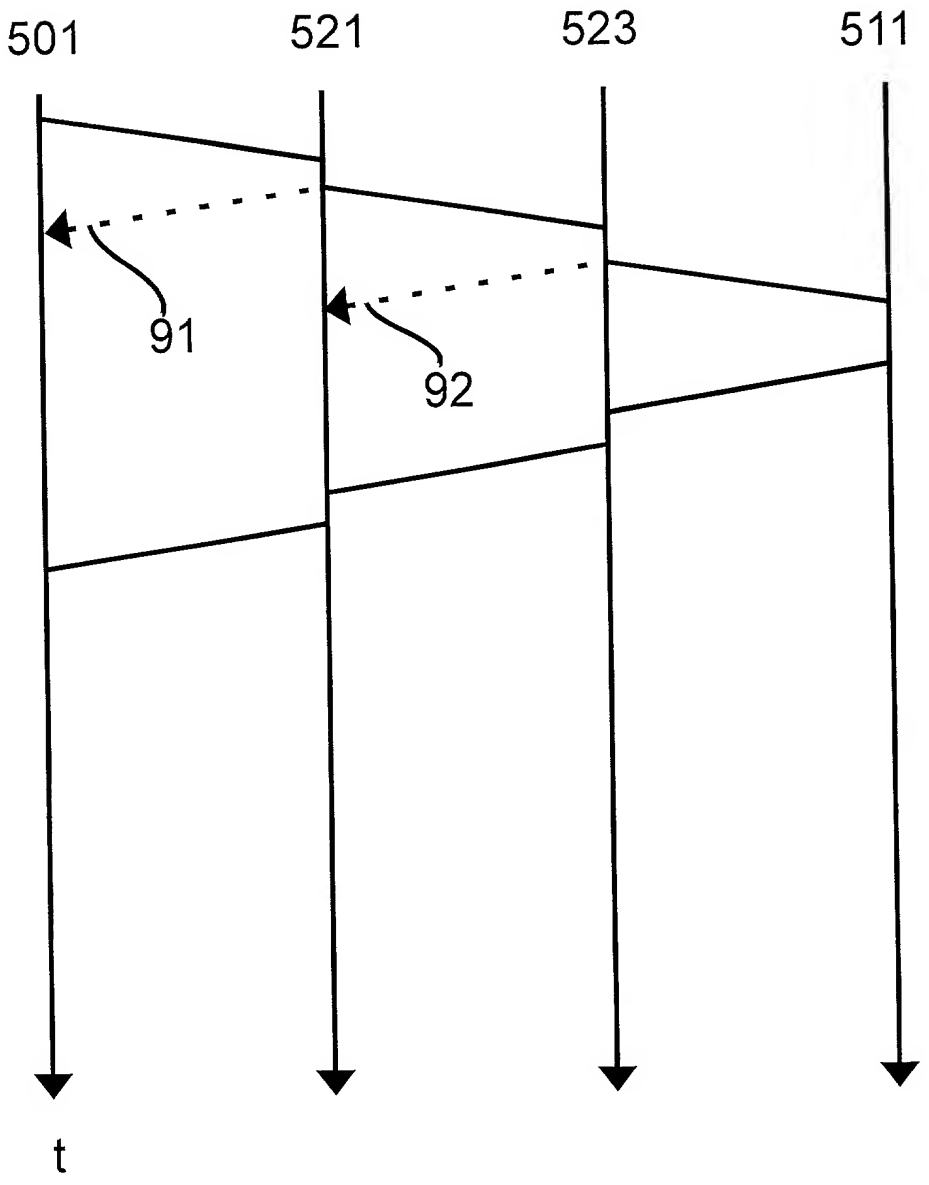

Fig.9

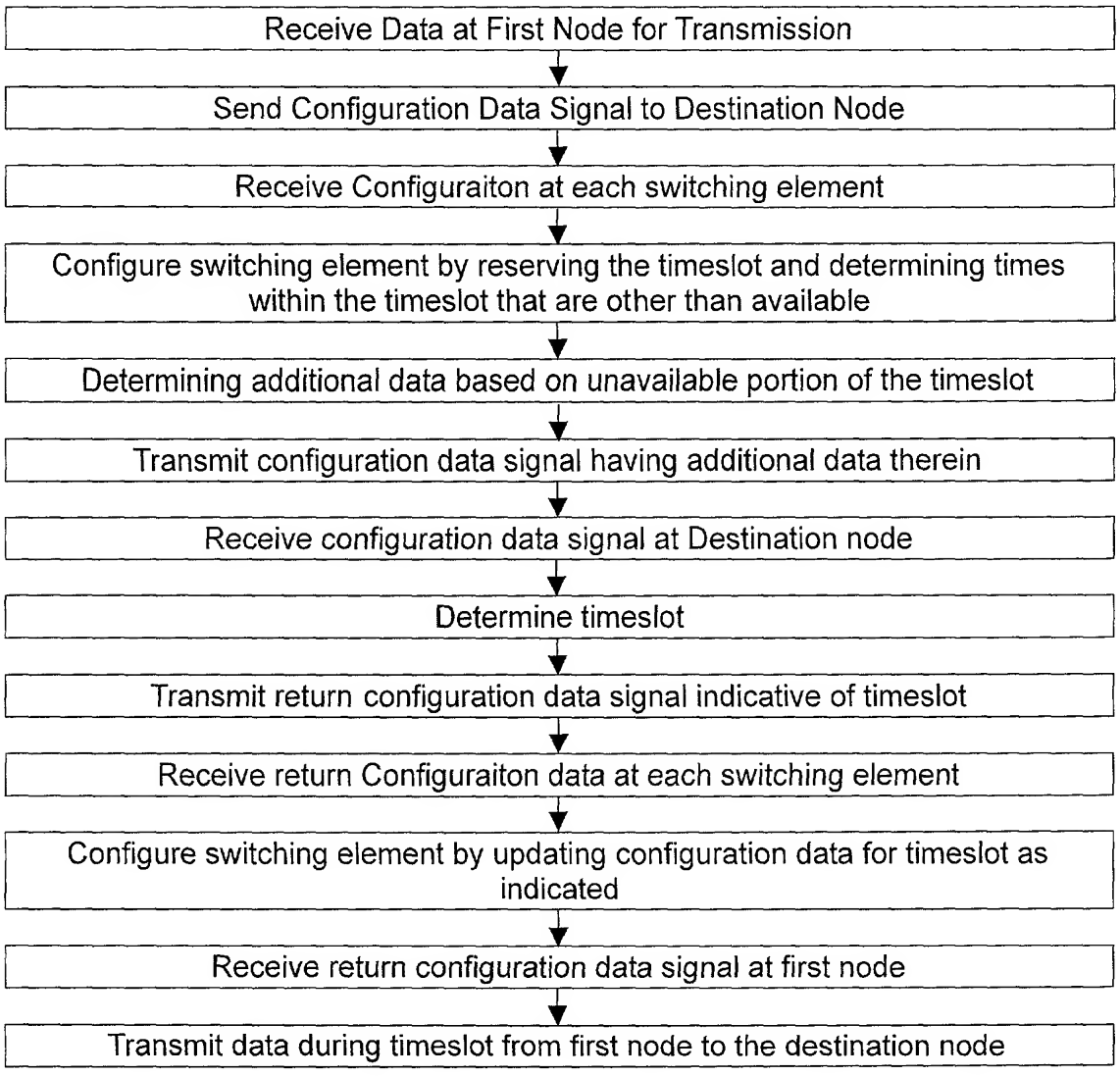
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuraiton at each switching element
Configure switching element by reserving the timeslot and determining times within the timeslot that are other than available
Determining additional data based on unavailable portion of the timeslot
Transmit configuration data signal having additional data therein
Receive configuration data signal at Destination node
Determine timeslot
Transmit return configuration data signal indicative of timeslot
Receive return Configuraiton data at each switching element
Configure switching element by updating configuration data for timeslot as indicated
Receive return configuration data signal at first node
Transmit data during timeslot from first node to the destination node

Fig. 10

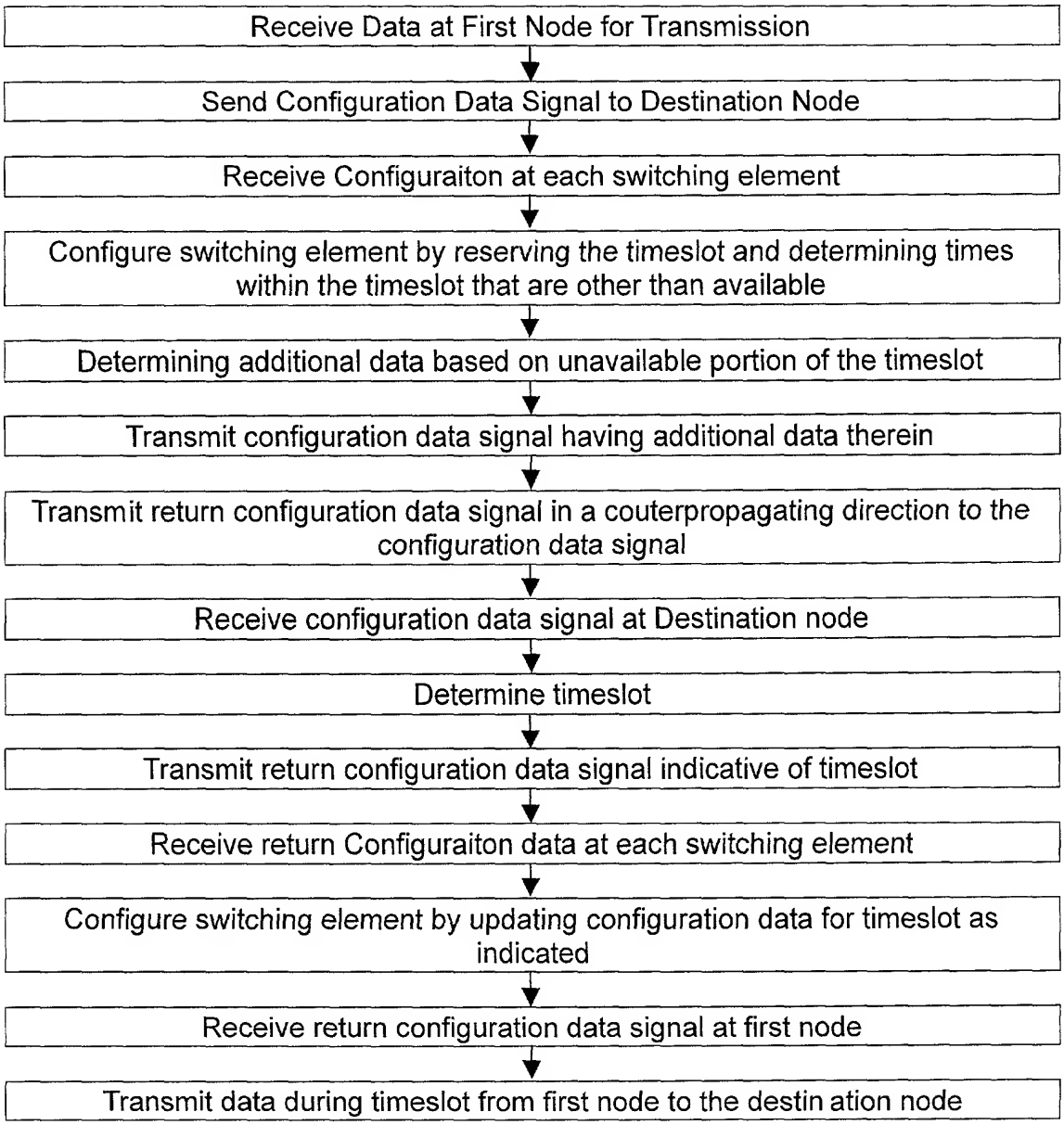

Fig. 11

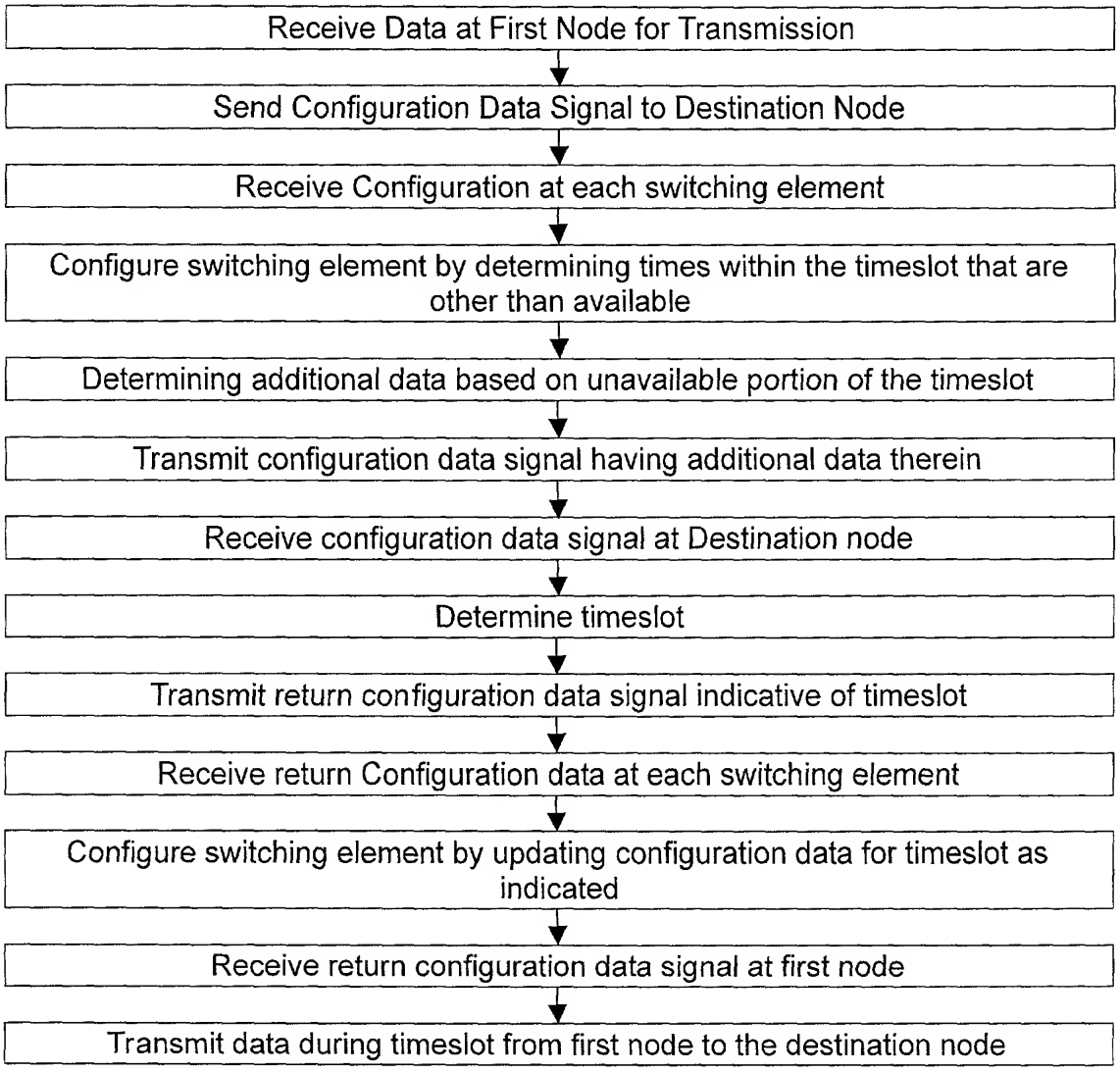
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuration at each switching element
Configure switching element by determining times within the timeslot that are other than available
Determining additional data based on unavailable portion of the timeslot
Transmit configuration data signal having additional data therein
Receive configuration data signal at Destination node
Determine timeslot
Transmit return configuration data signal indicative of timeslot
Receive return Configuration data at each switching element
Configure switching element by updating configuration data for timeslot as indicated
Receive return configuration data signal at first node
Transmit data during timeslot from first node to the destination node

Fig. 12

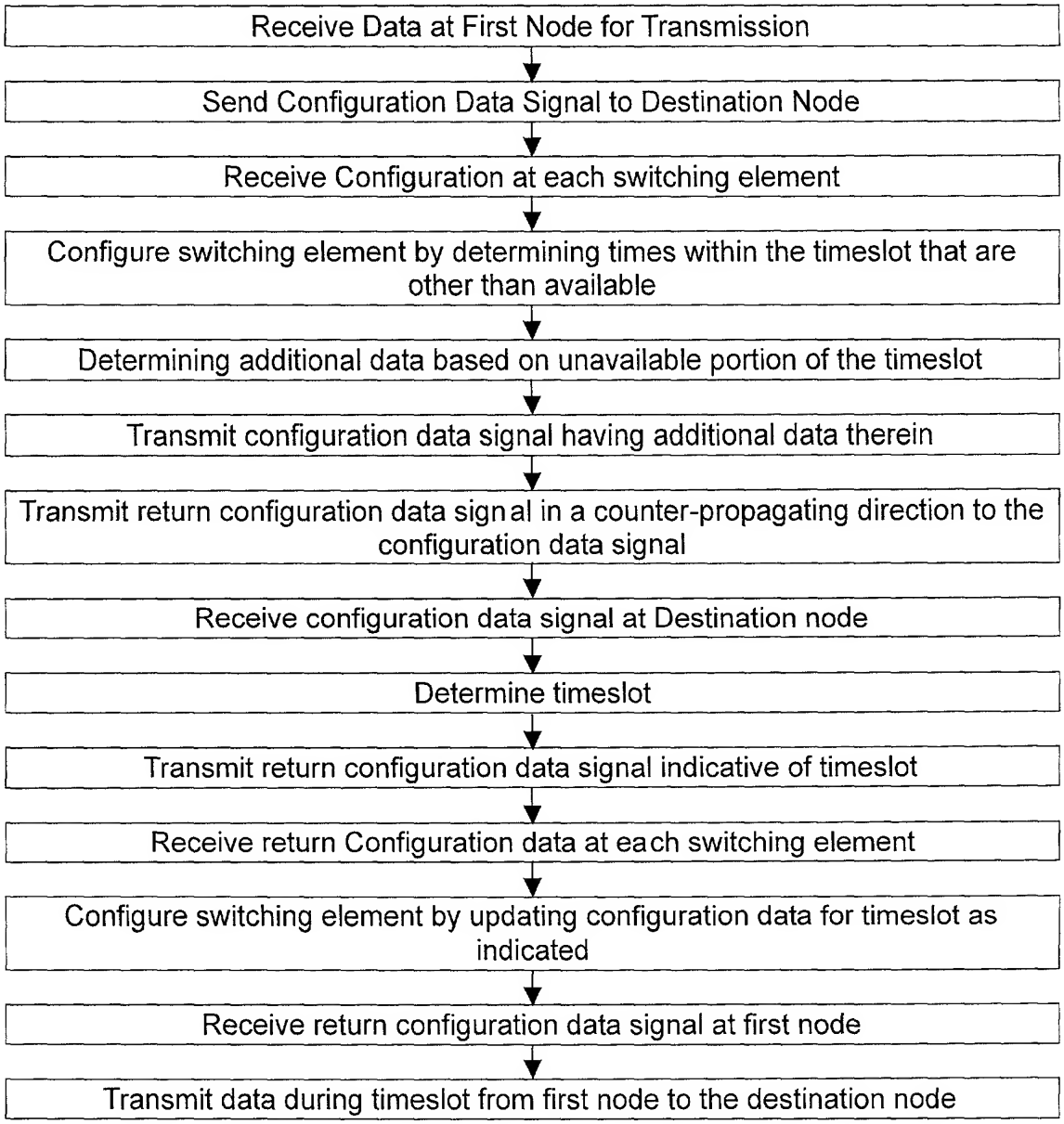
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuration at each switching element
Configure switching element by determining times within the timeslot that are other than available
Determining additional data based on unavailable portion of the timeslot
Transmit configuration data signal having additional data therein
Transmit return configuration data signal in a counter-propagating direction to the configuration data signal
Receive configuration data signal at Destination node
Determine timeslot
Transmit return configuration data signal indicative of timeslot
Receive return Configuration data at each switching element
Configure switching element by updating configuration data for timeslot as indicated
Receive return configuration data signal at first node
Transmit data during timeslot from first node to the destination node

Fig. 13

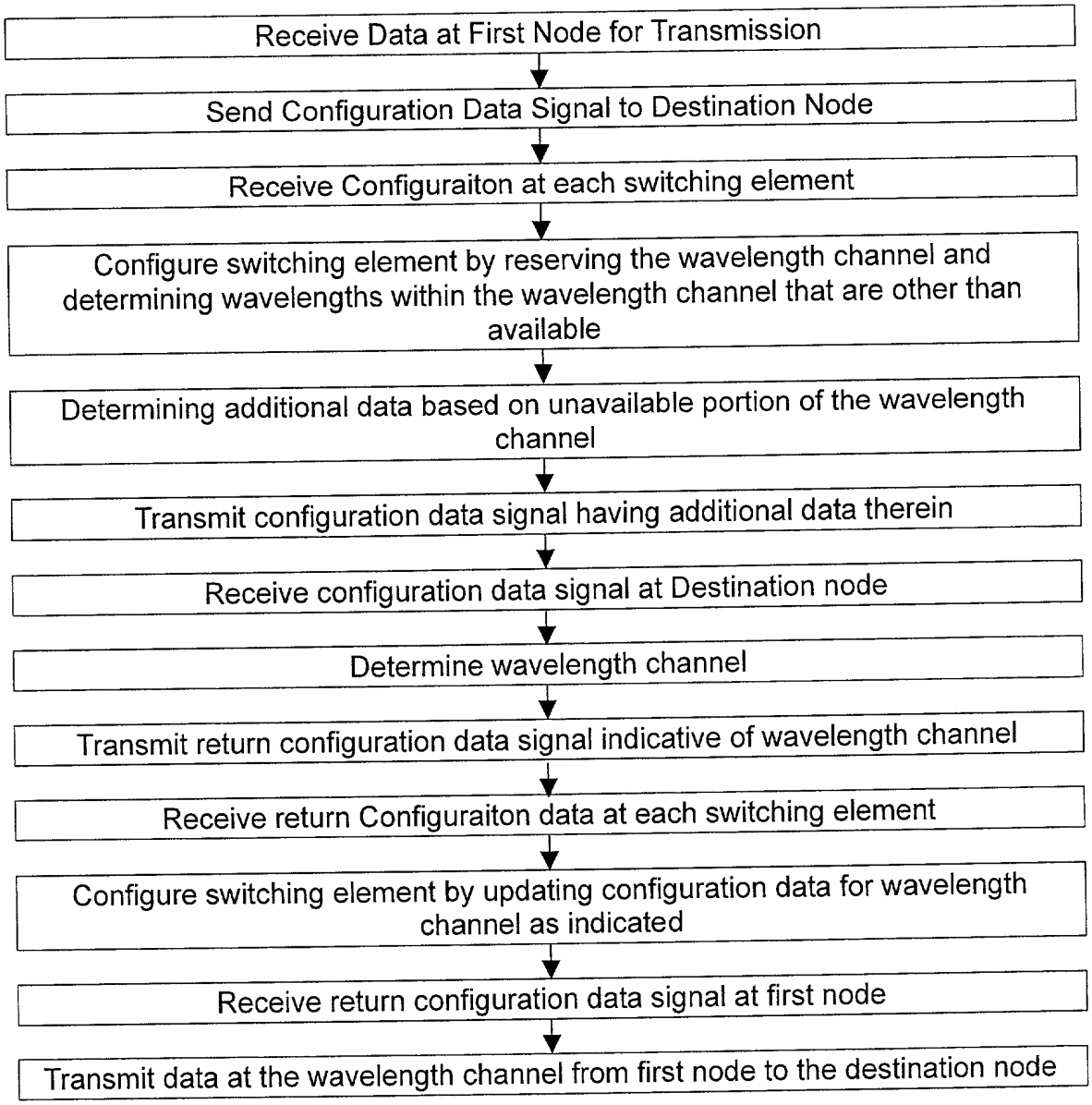
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuraiton at each switching element
Configure switching element by reserving the wavelength channel and determining wavelengths within the wavelength channel that are other than available
Determining additional data based on unavailable portion of the wavelength channel
Transmit configuration data signal having additional data therein
Receive configuration data signal at Destination node
Determine wavelength channel
Transmit return configuration data signal indicative of wavelength channel
Receive return Configuraiton data at each switching element
Configure switching element by updating configuration data for wavelength channel as indicated
Receive return configuration data signal at first node
Transmit data at the wavelength channel from first node to the destination node

Fig. 14

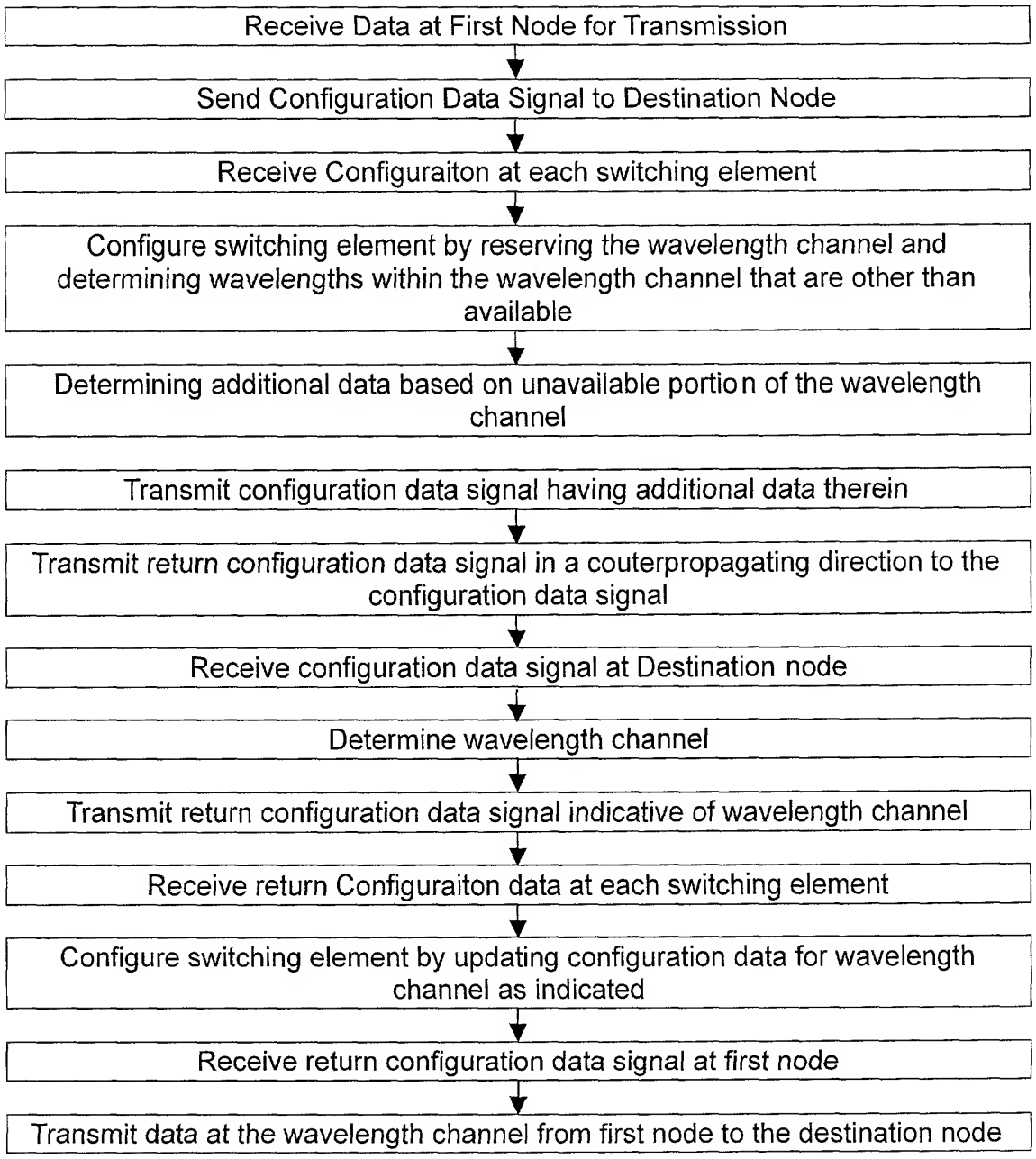
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuraiton at each switching element
Configure switching element by reserving the wavelength channel and determining wavelengths within the wavelength channel that are other than available
Determining additional data based on unavailable portion of the wavelength channel
Transmit configuration data signal having additional data therein
Transmit return configuration data signal in a couterpropagating direction to the configuration data signal
Receive configuration data signal at Destination node
Determine wavelength channel
Transmit return configuration data signal indicative of wavelength channel
Receive return Configuraiton data at each switching element
Configure switching element by updating configuration data for wavelength channel as indicated
Receive return configuration data signal at first node
Transmit data at the wavelength channel from first node to the destination node

Fig. 15

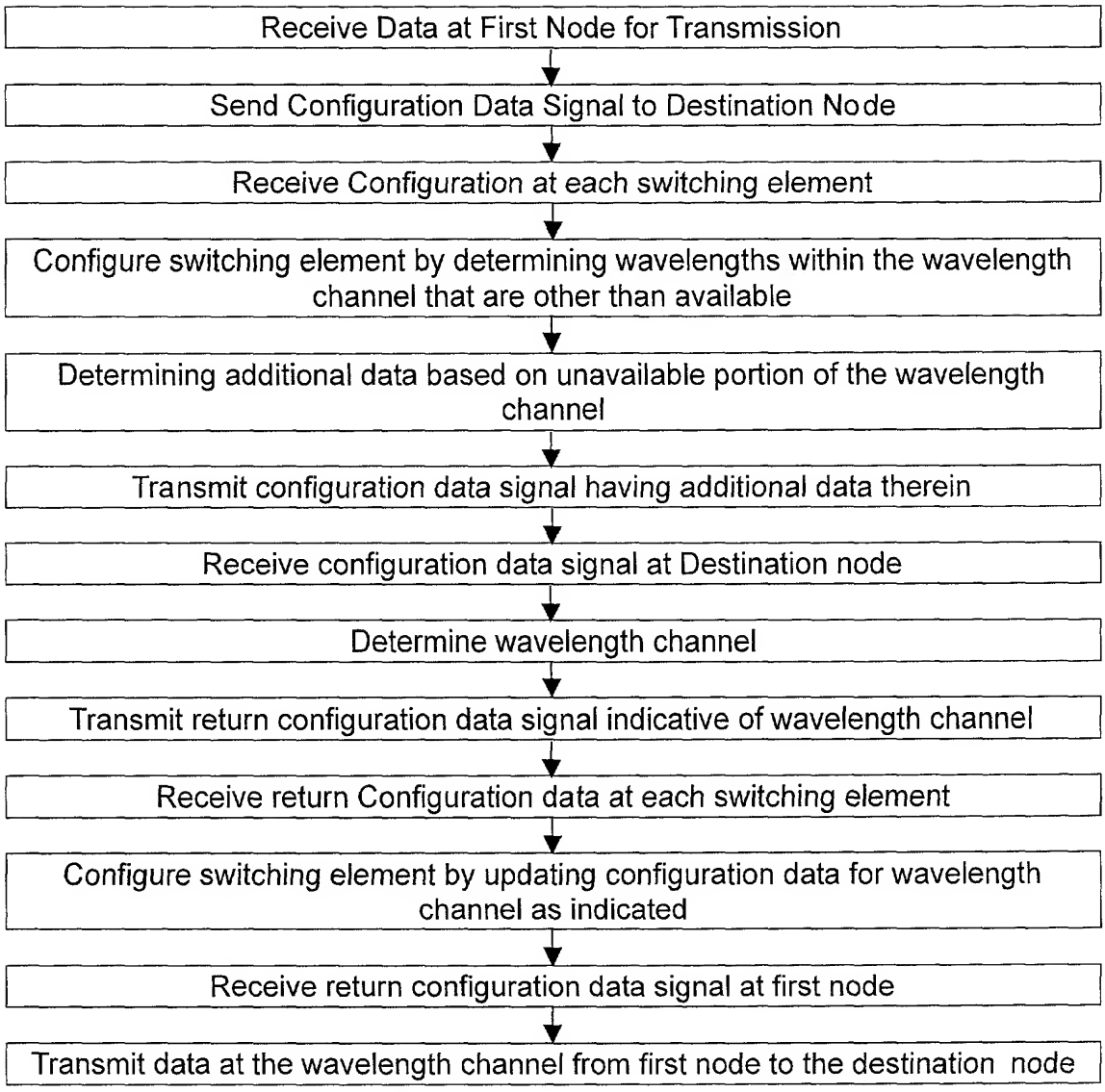
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuration at each switching element
Configure switching element by determining wavelengths within the wavelength channel that are other than available
Determining additional data based on unavailable portion of the wavelength channel
Transmit configuration data signal having additional data therein
Receive configuration data signal at Destination node
Determine wavelength channel
Transmit return configuration data signal indicative of wavelength channel
Receive return Configuration data at each switching element
Configure switching element by updating configuration data for wavelength channel as indicated
Receive return configuration data signal at first node
Transmit data at the wavelength channel from first node to the destination node

Fig. 16

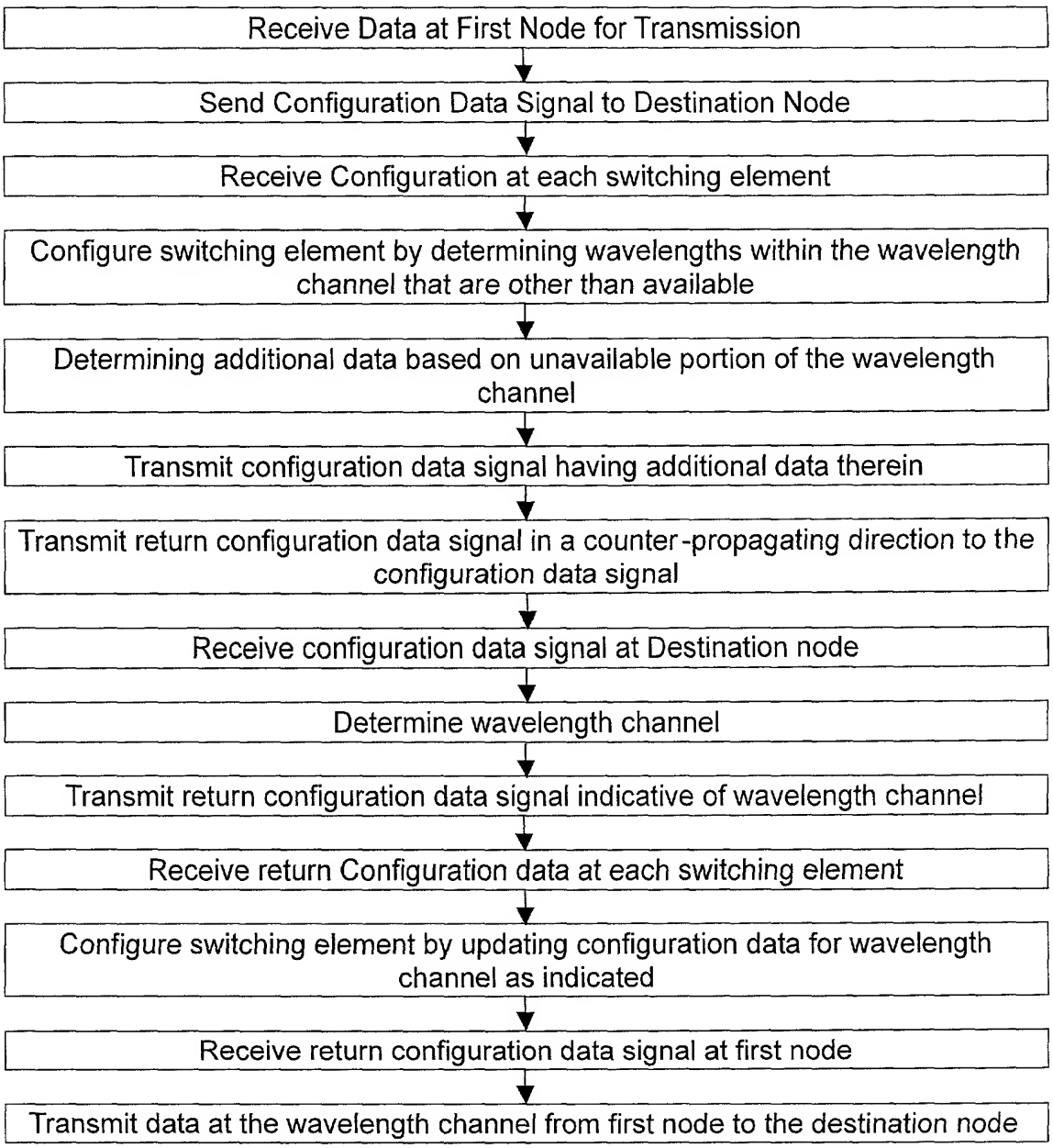
Receive Data at First Node for Transmission
Send Configuration Data Signal to Destination Node
Receive Configuration at each switching element
Configure switching element by determining wavelengths within the wavelength channel that are other than available
Determining additional data based on unavailable portion of the wavelength channel
Transmit configuration data signal having additional data therein
Transmit return configuration data signal in a counter-propagating direction to the configuration data signal
Receive configuration data signal at Destination node
Determine wavelength channel
Transmit return configuration data signal indicative of wavelength channel
Receive return Configuration data at each switching element
Configure switching element by updating configuration data for wavelength channel as indicated
Receive return configuration data signal at first node
Transmit data at the wavelength channel from first node to the destination node

Fig. 17

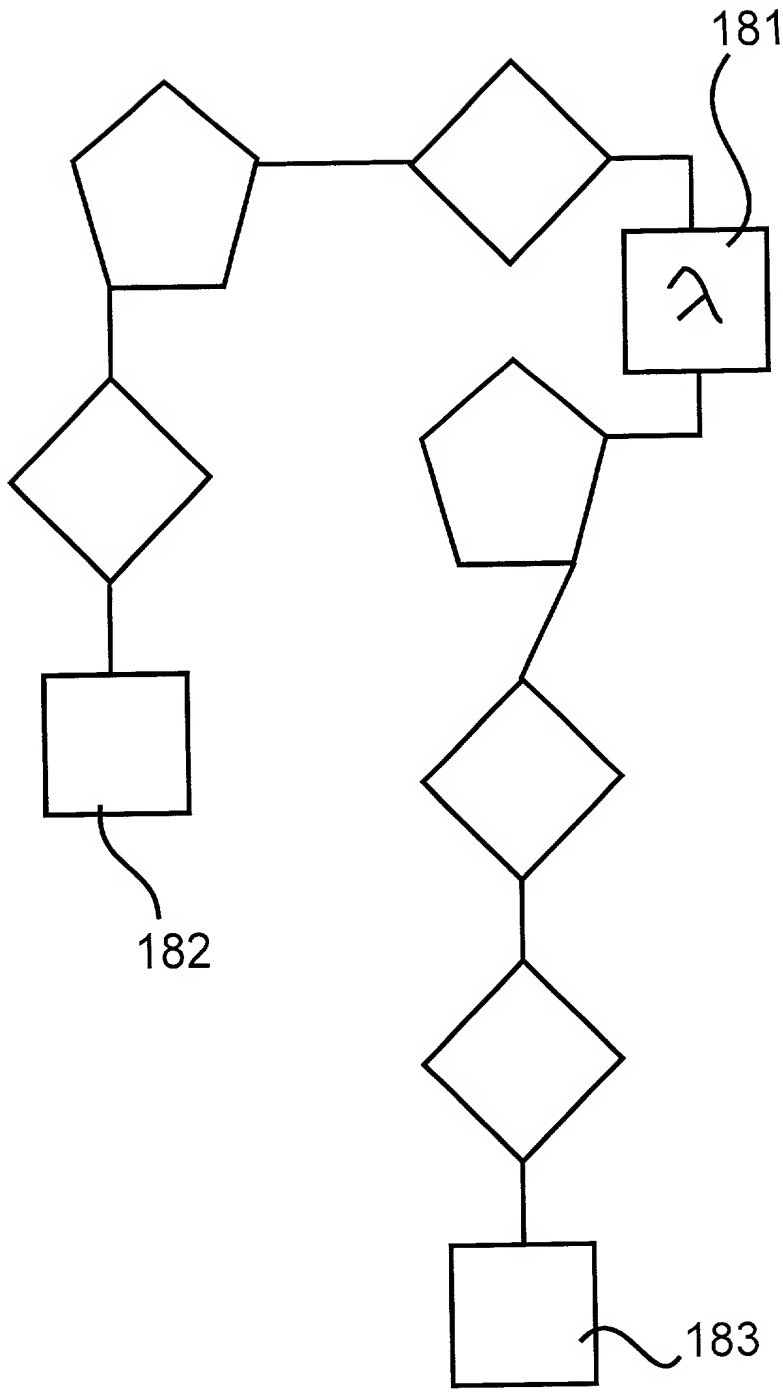

Fig. 18

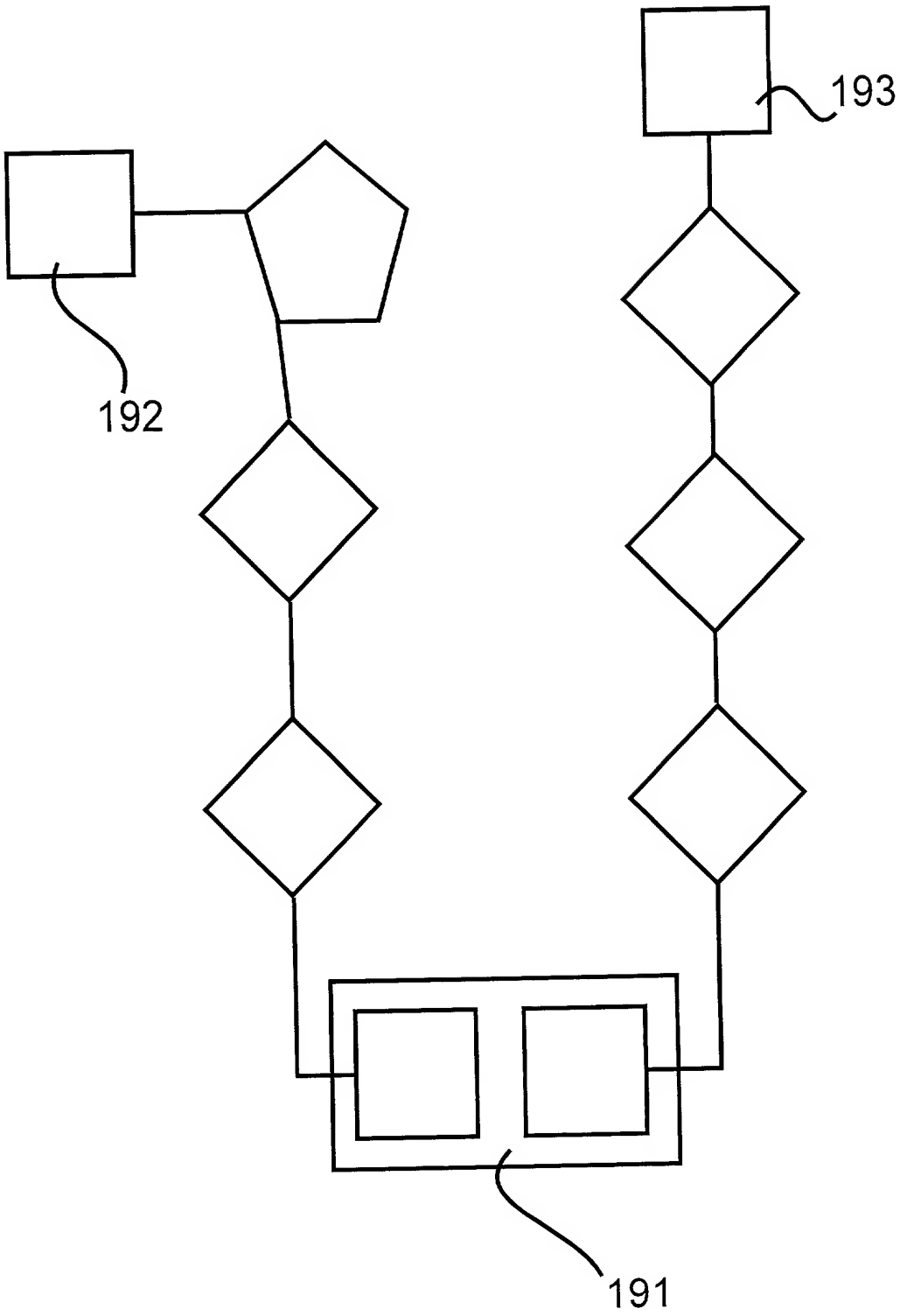

Fig. 19

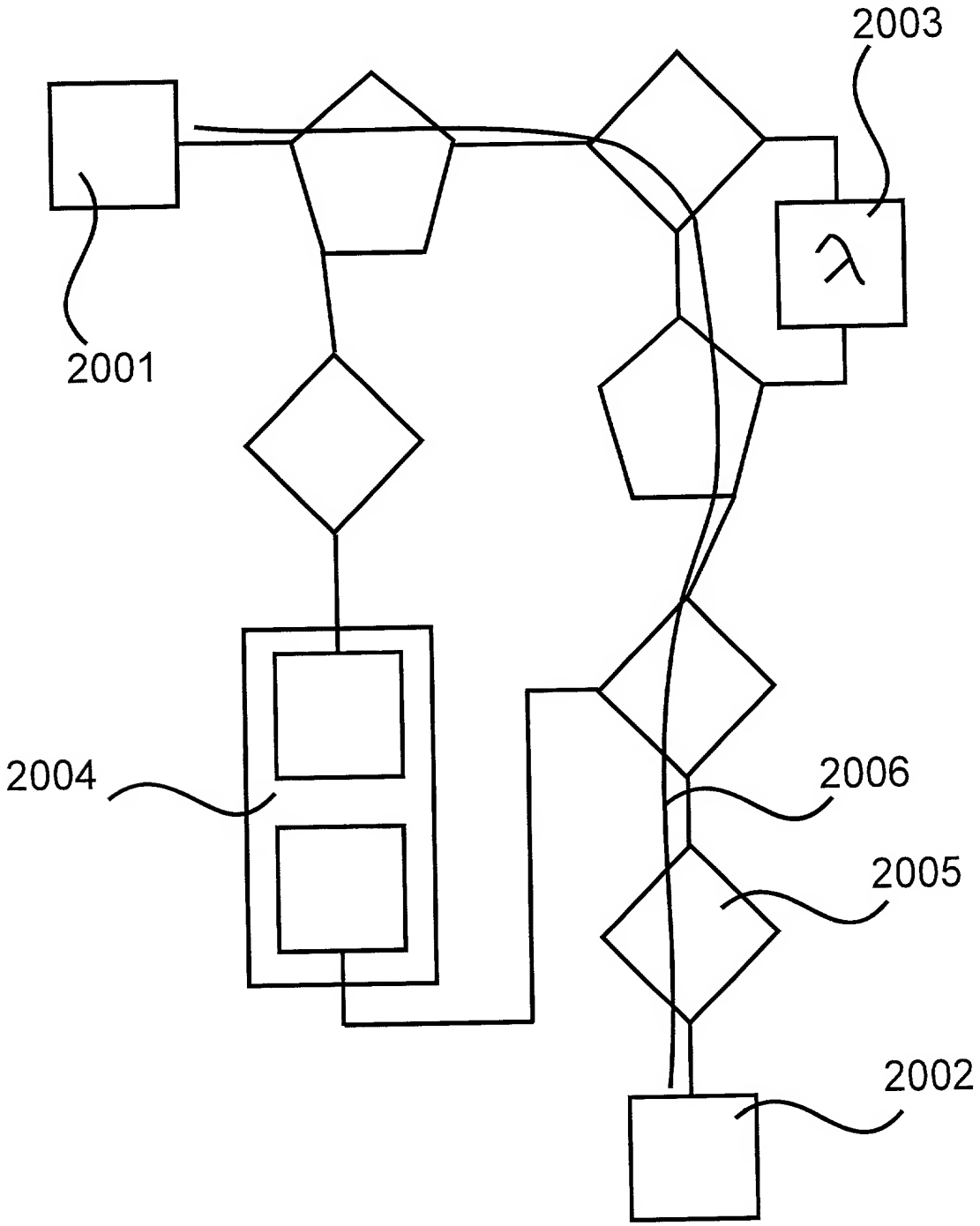

Fig. 20

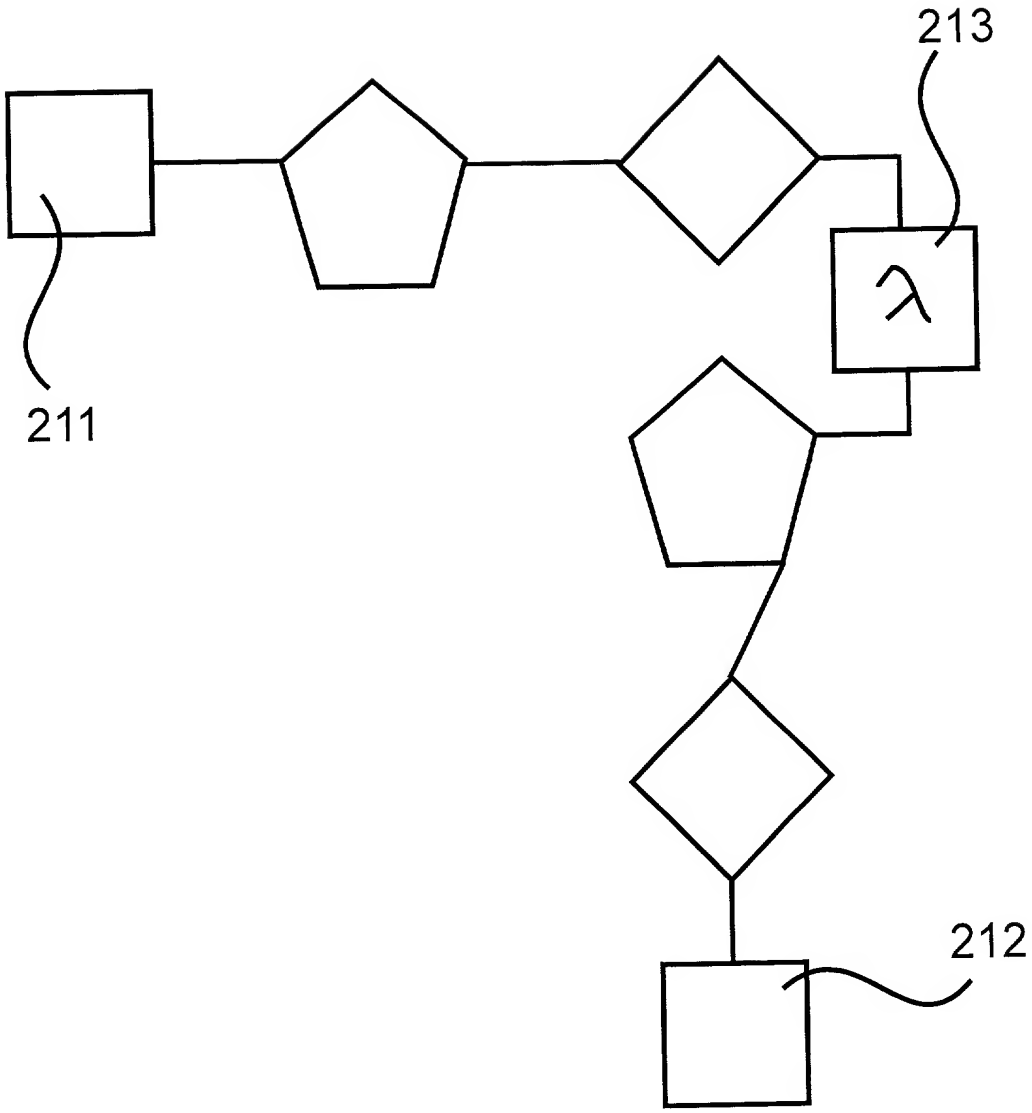

Fig. 21

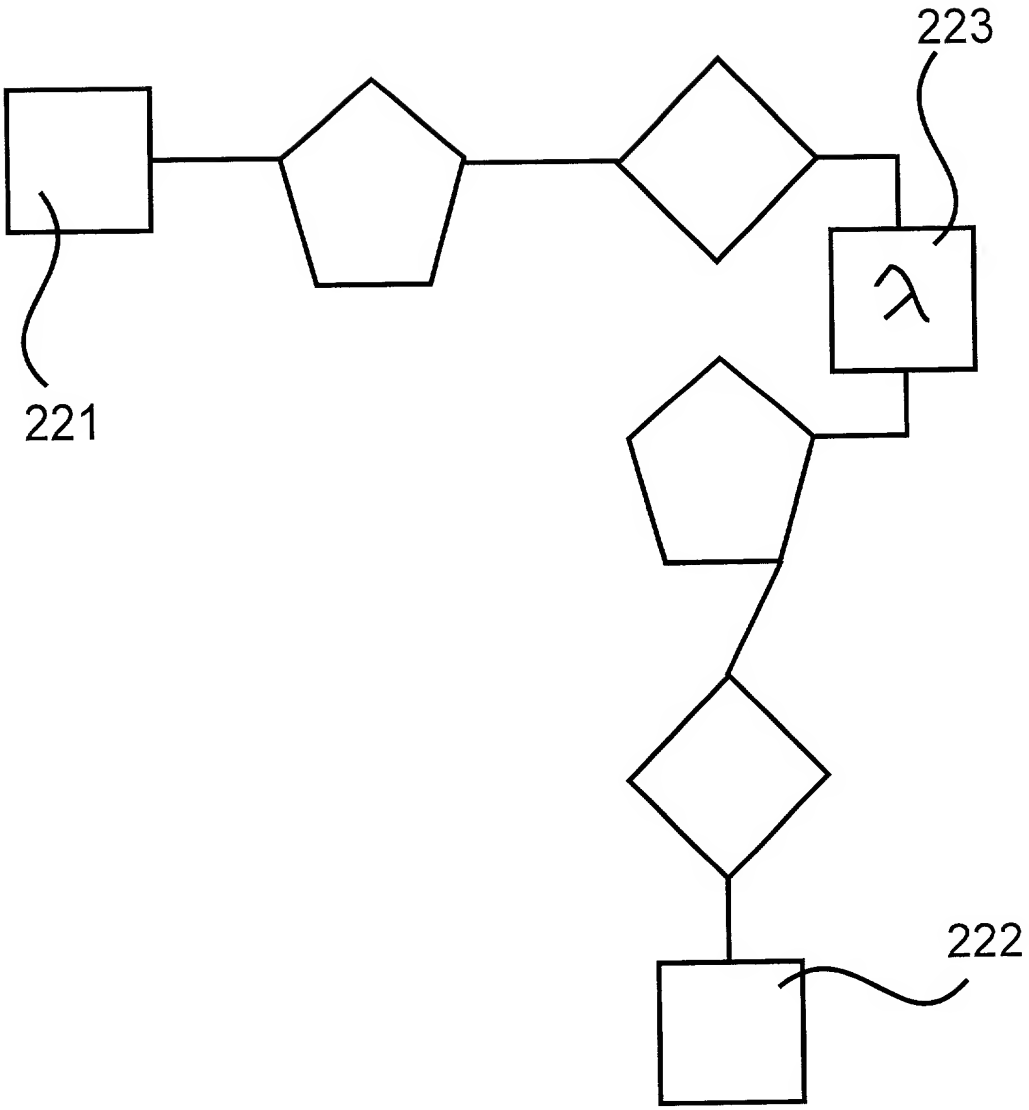

Fig. 22

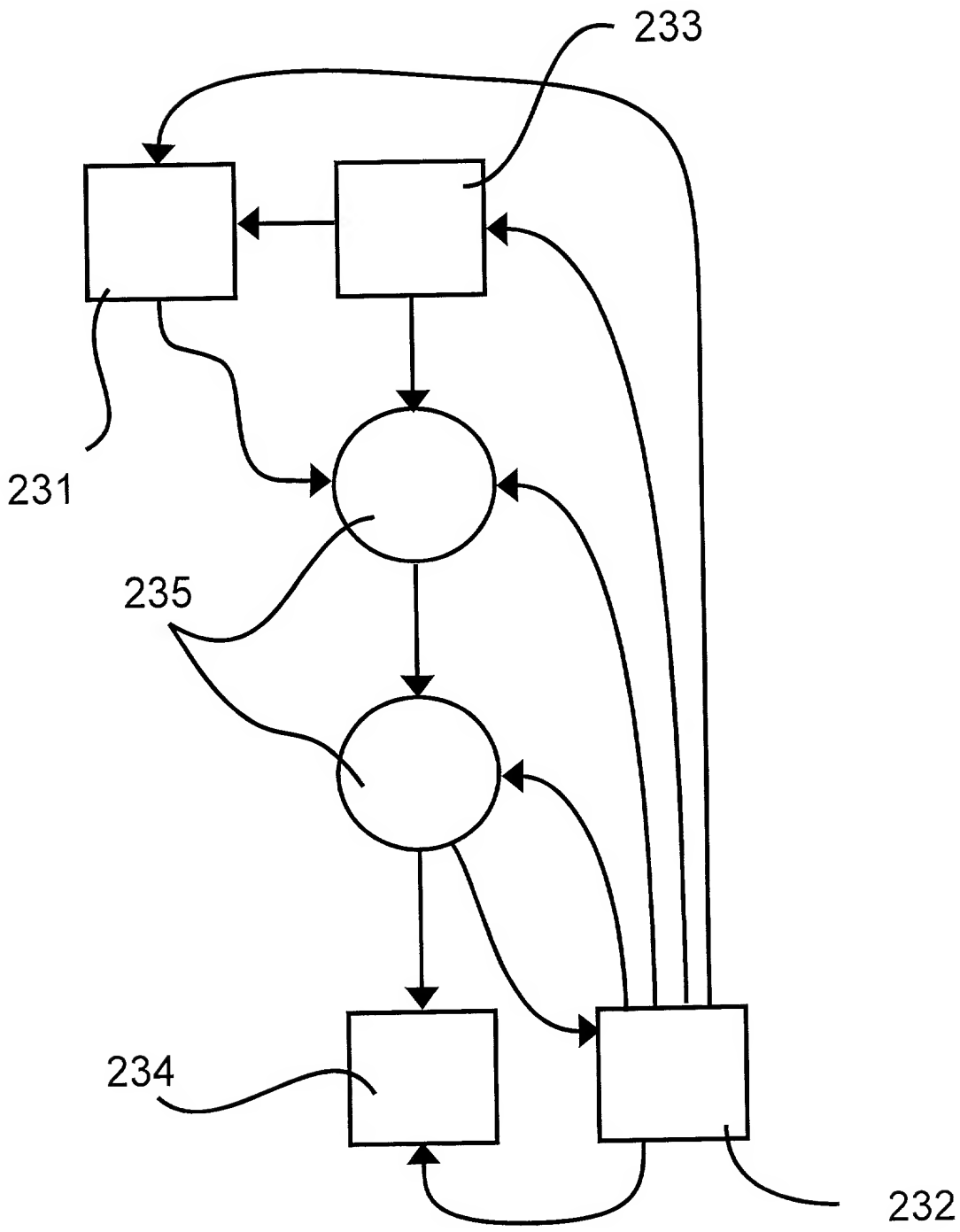

Fig. 23

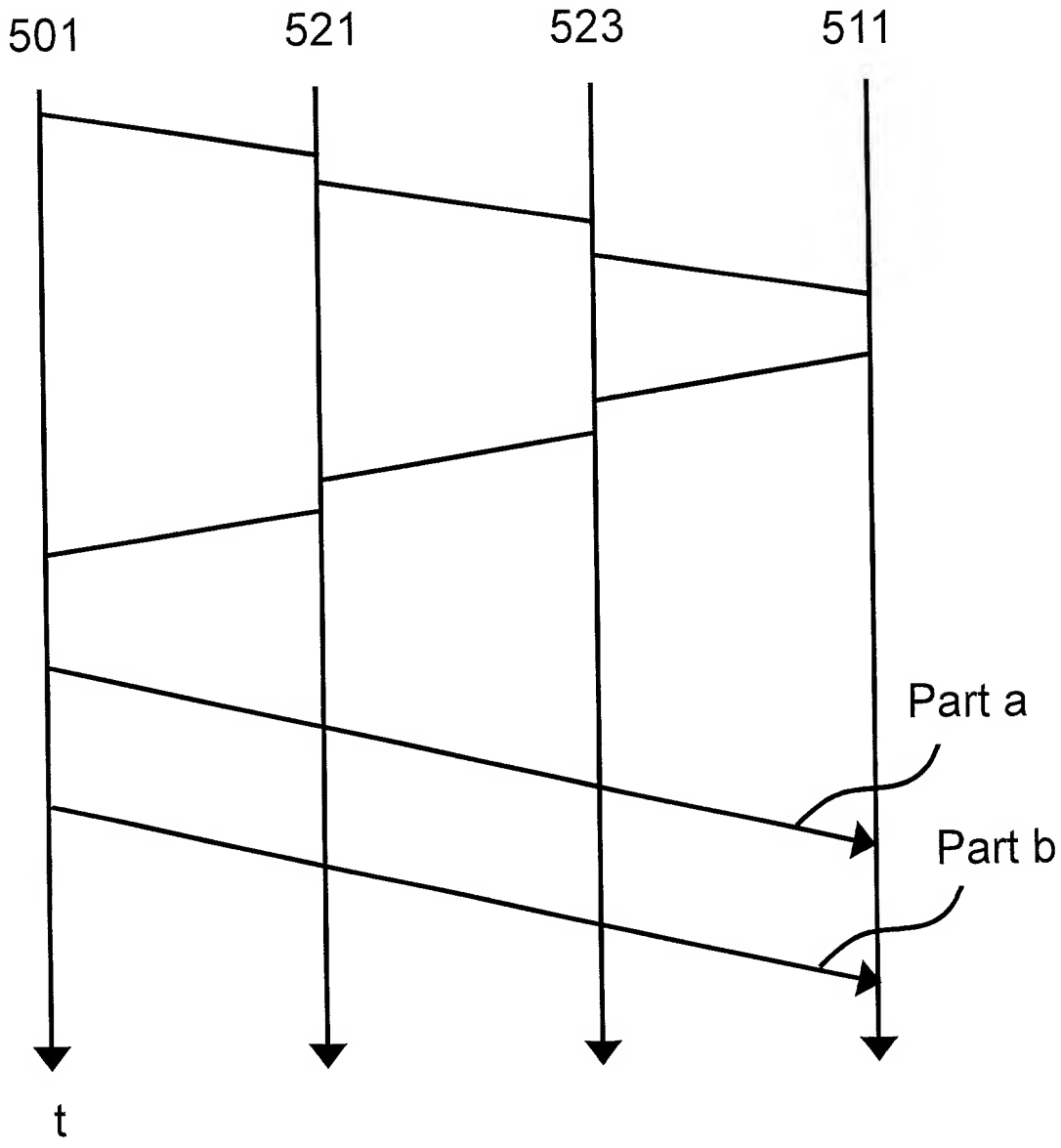

Fig.24

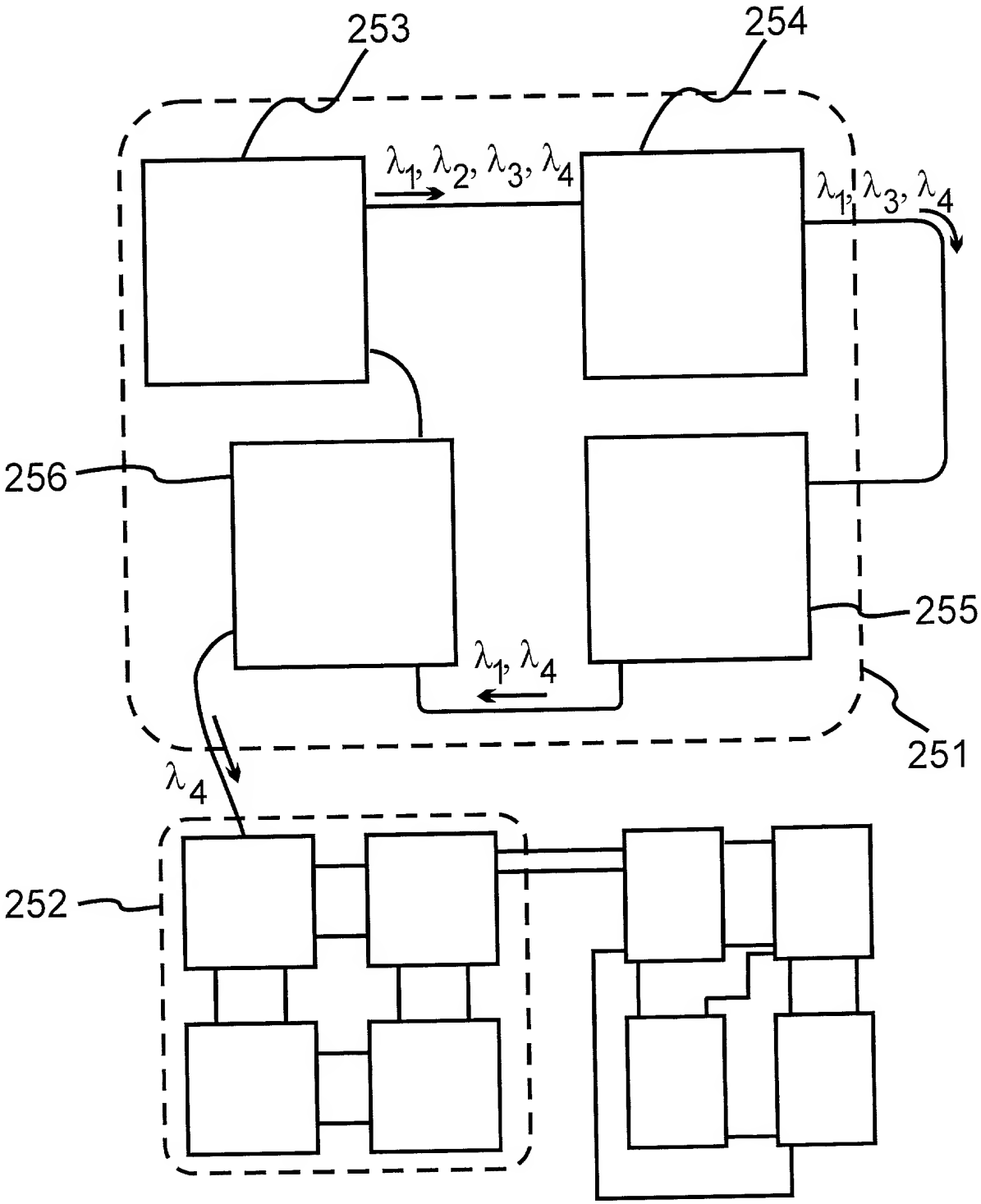
253
254
$\lambda_1, \lambda_2, \lambda_3, \lambda_4$
$\lambda_1, \lambda_3, \lambda_4$
256
255
λ_1, λ_4
251
λ_4
252

Fig. 25

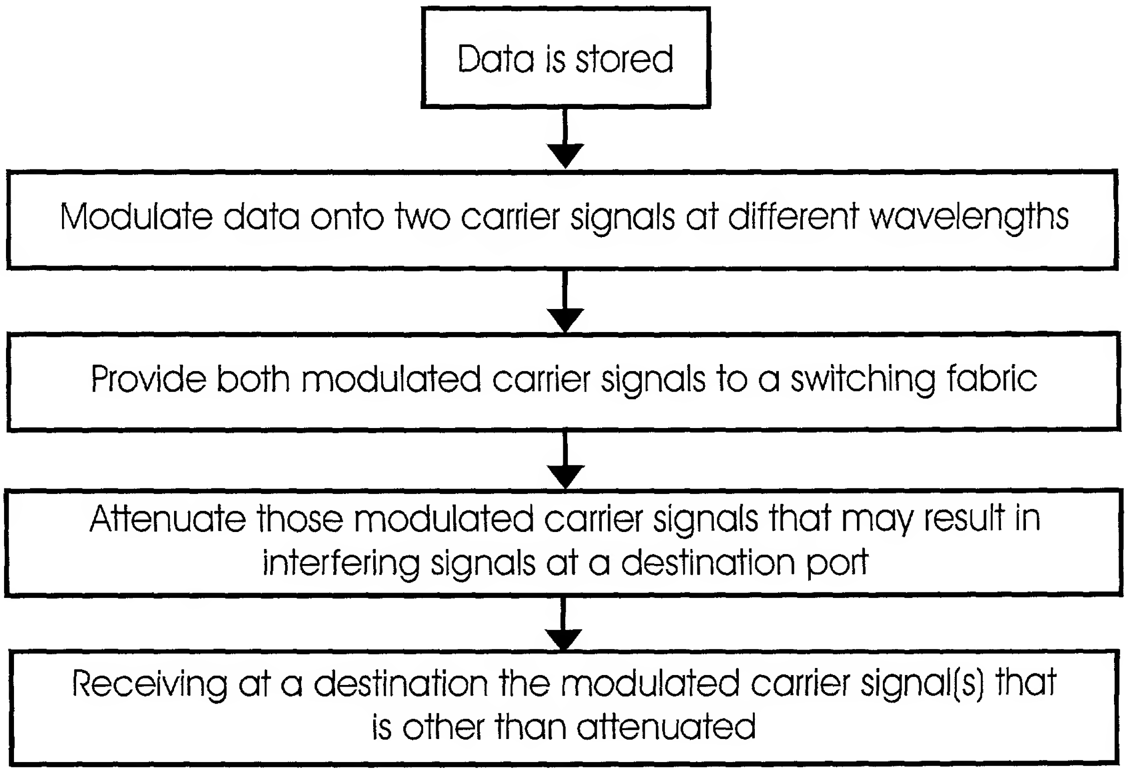

Fig. 26

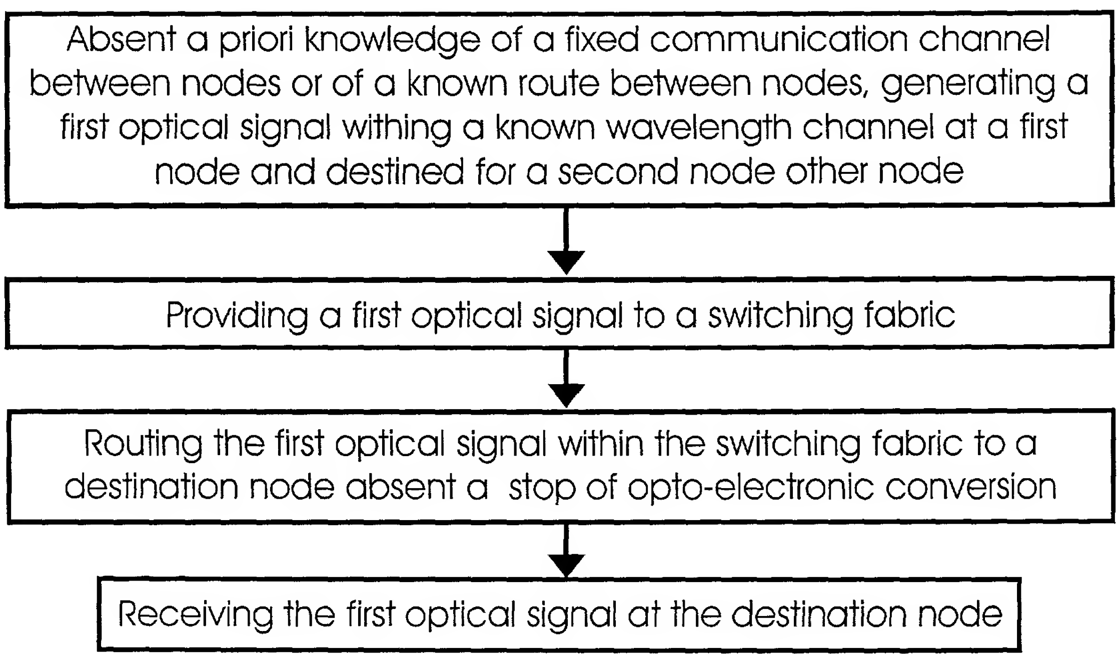

Fig. 27

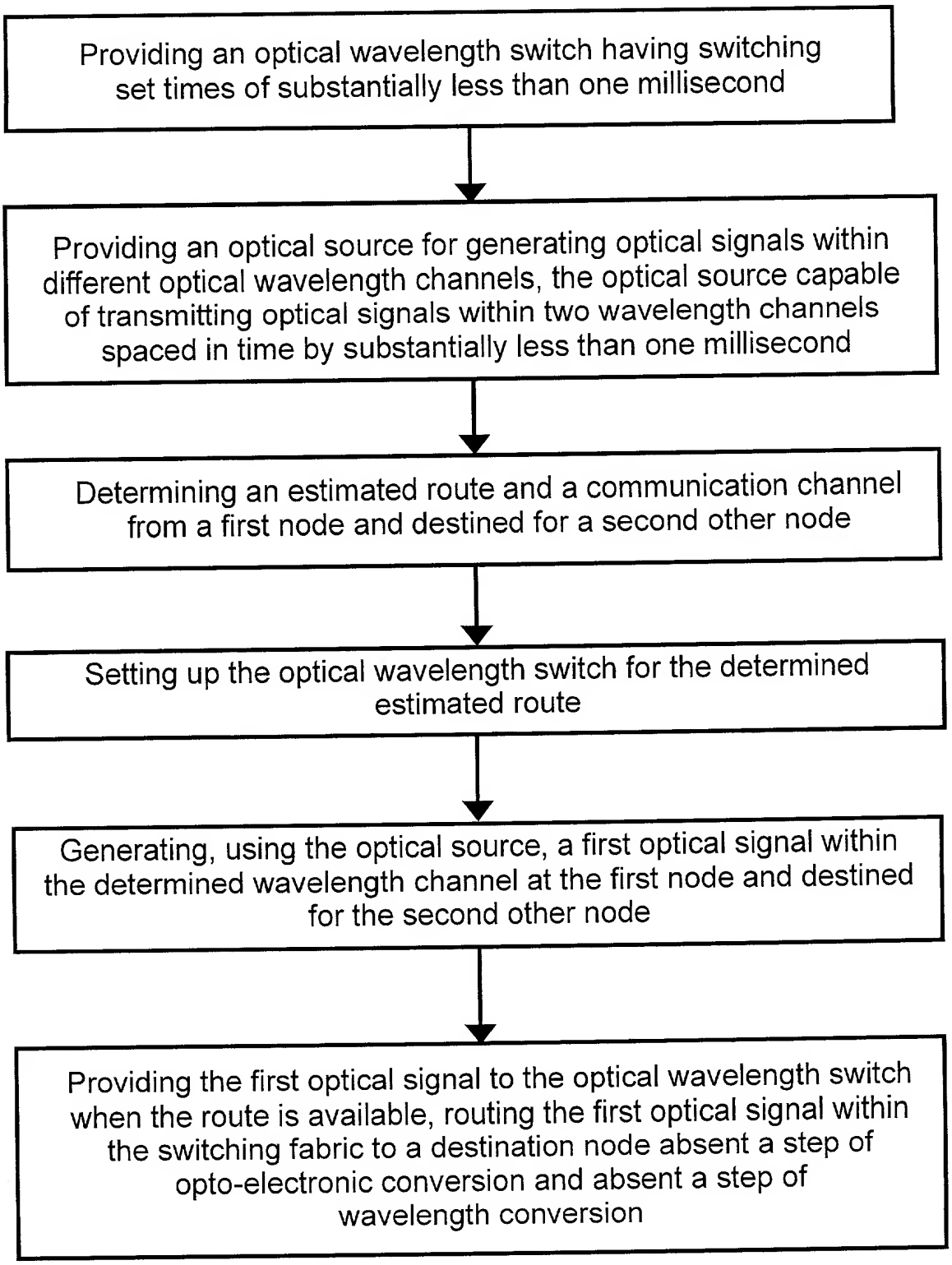
Providing an optical wavelength switch having switching set times of substantially less than one millisecond
Providing an optical source for generating optical signals within different optical wavelength channels, the optical source capable of transmitting optical signals within two wavelength channels spaced in time by substantially less than one millisecond
Determining an estimated route and a communication channel from a first node and destined for a second other node
Setting up the optical wavelength switch for the determined estimated route
Generating, using the optical source, a first optical signal within the determined wavelength channel at the first node and destined for the second other node
Providing the first optical signal to the optical wavelength switch when the route is available, routing the first optical signal within the switching fabric to a destination node absent a step of opto-electronic conversion and absent a step of wavelength conversion

Fig. 28

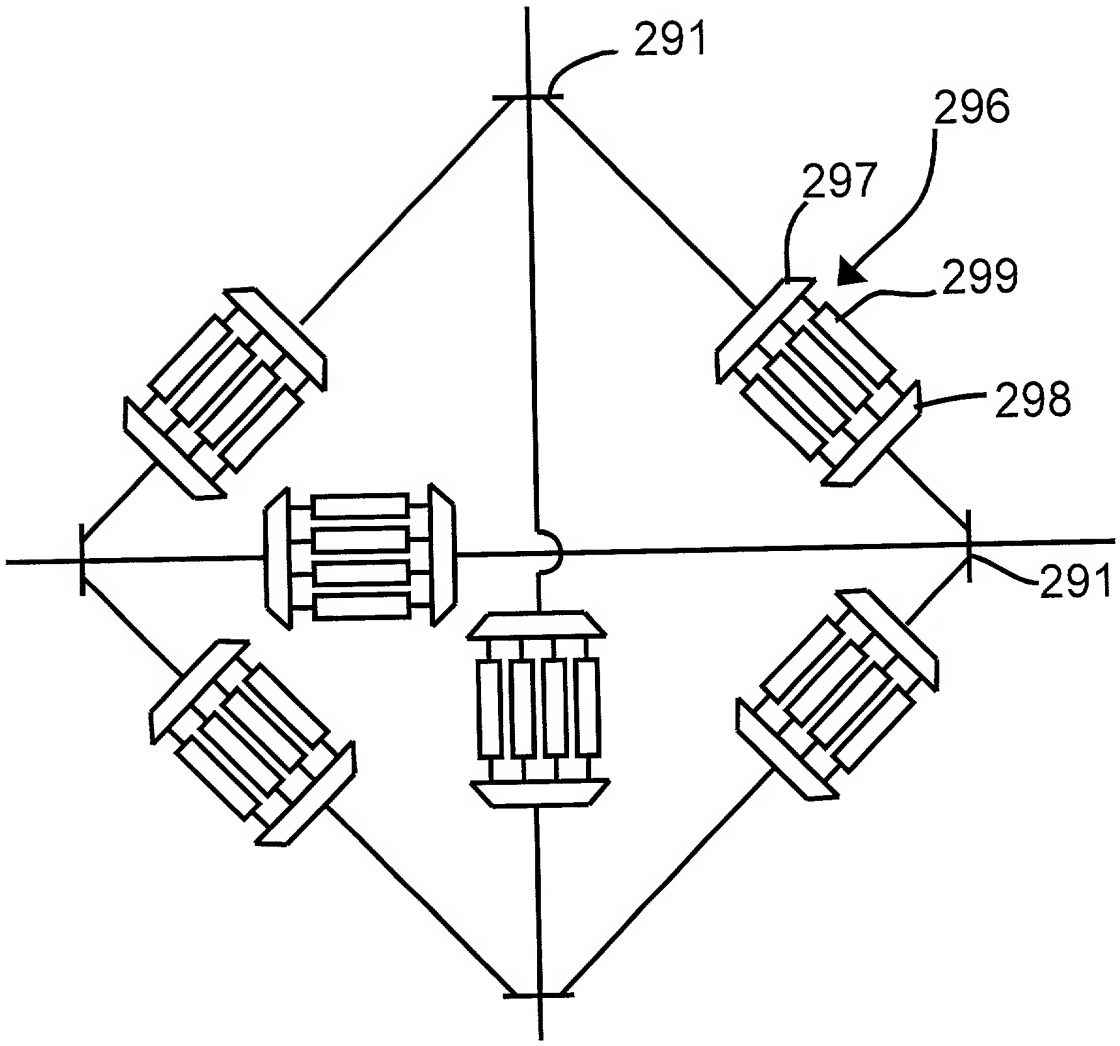

Fig. 29

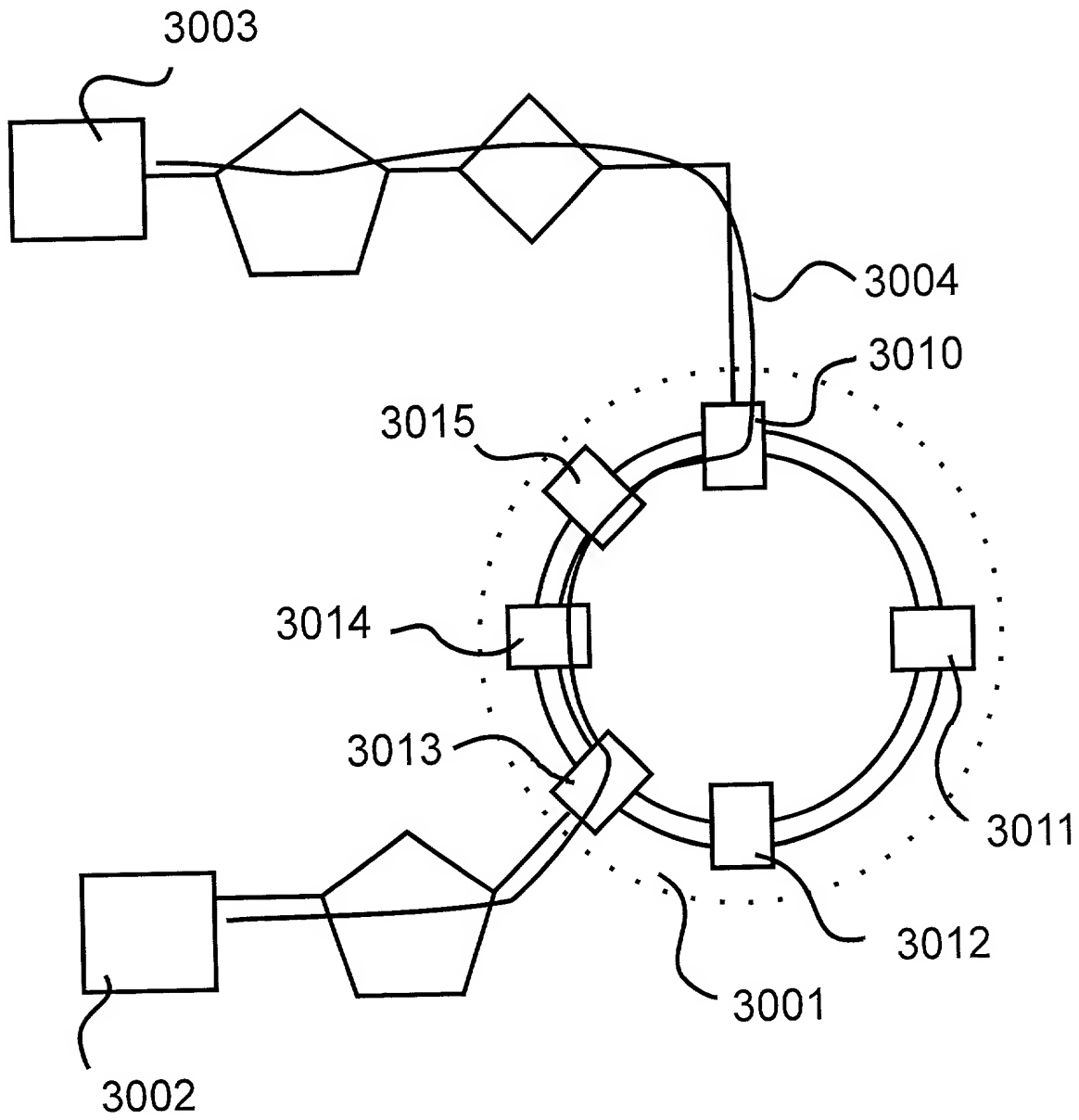

Fig. 30